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Kisspeptins and kisspeptin receptors in the rat and human carotid body

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The human *KISS1* gene encodes for a 145 amino acid precursor which can be cleaved into a 54 amino acid protein, originally called metastin, and shorter 14, 13 and 10 amino acid peptides, collectively named kisspeptins. The kisspeptin receptor, called KISS1R in humans and Kiss1r in rodents, was initially discovered in rats in 1999 as an orphan G protein-coupled membrane receptor named GPR54, in 2001 kisspeptins being identified as its natural ligands. KISS1 and KISS1R have both been found to be widely expressed in many tissues but to the best of our knowledge, there are no data regarding expression of kisspeptin and kisspeptin receptor in the carotid body. Thus, the aim of the present study was to investigate, through immunohistochemistry, the expression and distribution of KISS1 and KISS1R in the rat and human carotid body, also with particular reference to the different cellular populations. Materials consisted of carotid bodies obtained at autopsy from 10 adult subjects and sampled from 10 adult Sprague-Dawley rats. The study was performed in accordance with the Italian Public Health Office regulations and under appropriate ethical committee approval. No kisspeptins and kisspeptin receptor immunoreactivities were visible in the type II cells of both series. Conversely, anti-kisspeptin immunoreactivity was found in type I cells of both humans and rats. Diffuse positive staining for kisspeptin receptors was also observed in human and rat type I cells. Endothelial cells also showed positive immunoreactions. Our findings about expression of both kisspeptins and kisspeptin receptors in type I cells, which represent the real chemoreceptive element of the carotid body, support a modulatory role of KISS1 on peripheral chemoreception. Kisspeptin is known to modulate release of other peptides in hypophysis and islets of Langherans and such regulatory action on the release of neuromodulators could also be hypothesized for glomic type I cells. Moreover, local changes in blood flow have been considered to be involved in carotid body chemoreceptor discharge and kisspeptins and kisspeptin receptors have also been found in the endothelial cells. As a consequence, a possible role of kisspeptins in the regulation of carotid body blood flow and, indirectly, in chemoreceptor discharge may be hypothesized.